Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL QUALITY MEASURES CLEARINGHOUSE

General

Title

Diabetes mellitus: percentage of patients aged 18 years and older with a diagnosis of diabetes mellitus who had a lower extremity neurological exam performed at least once within 12 months.

Source(s)

American Podiatric Medical Association (APMA). Diabetic foot and ankle care physician performance measurement set. Bethesda (MD): American Podiatric Medical Association; 2014 Aug. 13 p.

Measure Domain

Primary Measure Domain

Clinical Quality Measures: Process

Secondary Measure Domain

Does not apply to this measure

Brief Abstract

Description

This measure is used to assess the percentage of patients aged 18 years and older with a diagnosis of diabetes mellitus who had a lower extremity neurological exam performed at least once within 12 months.

Rationale

People with diabetes rarely have their feet examined on a regular basis. Despite efforts with quality measures, performance improvement programs, etc., the occurrence of yearly foot examinations remains consistently below 60% in most studies.

Most cases of lower extremity limb loss in the United States occur among people with diabetes who have a diabetic foot ulcer (DFU). These DFUs and the associated limb loss that may occur lead to excess healthcare costs and have a large negative impact on mobility, psychosocial well-being, and quality of life. The strategies for DFU prevention and management are evolving, but the implementation of these

prevention and management strategies remains challenging. Barriers to implementation include poor access to primary medical care; patient beliefs and lack of adherence to medical advice; delays in DFU recognition; limited healthcare resources and practice heterogeneity of specialists.

The primary risk factor for diabetic ulcerations is loss of protective sensation (peripheral neuropathy). A yearly neurological examination of the lower extremity for a person with diabetes is essential. Risk classification based on neurologic findings and an appropriate treatment plan based on risk category can lead to a significant decrease in ulcerations and amputations. Diabetes and subsequent foot complications affect incredibly high numbers of people. The cost in both money and quality of life for the person with diabetes who develops an ulceration that leads to an amputation is staggering. The five year survival rate for a person with diabetes that undergoes an amputation is less than many forms of cancer (Frykberg et al., 2000).

Clinical Recommendation Statements:

Recognizing important risk factors and making a logical, treatment-oriented assessment of the diabetic foot requires a consistent and thorough diagnostic approach using a common language. Without such a method, the practitioner is more likely to overlook vital information and to pay inordinate attention to less critical points in the evaluation. A useful examination will involve identification of key risk factors and assignment into appropriate risk category. Only then can an effective treatment plan be designed and implemented (Frykberg et al., 2000).

For all patients with diabetes, perform an annual comprehensive foot examination to identify risk factors predictive of ulcers and amputations. The foot examination should include inspection, assessment of foot pulses, and testing for loss of protective sensation (LOPS) (10-g monofilament plus testing any one of the following: vibration using 128-Hz tuning fork, pinprick sensation, ankle reflexes, or vibration perception threshold) (American Diabetes Association, 2014).

Risk categorization should be done according to the following table and follow-up treatment plan should be done according to the following table:

Risk Categorization System		
Category	**Risk Profile**	**Evaluation Frequency**
0	Normal	Annual
1	Peripheral neuropathy (loss of protective sensation [LOPS])	Semi-annual
2	Neuropathy, deformity, and/or peripheral arterial disease (PAD)	Quarterly
3	Previous ulcer or amputation	Monthly to quarterly

Evidence for Rationale

American Diabetes Association. Diabetes care position statement. Diabetes Care. 2014 Jan;37:Suppl 1.

American Podiatric Medical Association (APMA). Diabetic foot and ankle care physician performance measurement set. Bethesda (MD): American Podiatric Medical Association; 2014 Aug. 13 p.

Frykberg RG, Armstrong DG, Giurini J, Edwards A, Kravette M, Kravitz S, Ross C, Stavosky J, Stuck R, Vanore J. Diabetic foot disorders: a clinical practice guideline. Brooklandville (MD): Data Trace Publishing Company; 2000. 60 p.

Primary Health Components

Diabetes mellitus; peripheral neuropathy; lower extremity neurological exam

Denominator Description

All patients aged 18 years and older with a diagnosis of diabetes mellitus (see the related "Denominator Inclusions/Exclusions" field)

Numerator Description

Patients who had a lower extremity neurological exam performed at least once within 12 months (see the related "Numerator Inclusions/Exclusions" field)

Evidence Supporting the Measure

Type of Evidence Supporting the Criterion of Quality for the Measure

A clinical practice guideline or other peer-reviewed synthesis of the clinical research evidence

Additional Information Supporting Need for the Measure

- The 2012 document produced by the American Medical Association (AMA) and National Committee for Quality Assurance (NCQA) noted that "just 55% of people with diabetes obtain annual foot examinations." They further note that "racial and ethnic disparities persist as well. African Americans and Hispanics are significantly more likely to die of diabetes-related complications than are Caucasians, while Native Americans and other vulnerable populations suffer under a disproportionate burden of diabetes-related morbidity and mortality."
- The Centers for Disease Control and Prevention (CDC) examined the proportion of diabetic adults (over age 18) that received a foot exam in a given year. This data was categorized based on race/ethnicity, age, sex, and education level. In 2010, hispanics had the lowest percentage of foot exams (59%) in comparison to whites (71%) and blacks (77%) (CDC, "By Race/Ethnicity," 2012). In the same year, smaller disparities were seen according to age. Nearly 75% of all adults with diabetes between ages 65 to 74 received a foot exam, about 73% of adults between ages 45 to 64 and 71.5% of adults over age 75 (CDC, "By Age," 2012). There were not significant disparities by gender: In 2010, 72.3% of males and 70.7% of females received foot exams (CDC, "By Sex," 2012). Adults with an education greater than high school received foot exams at 70% while adults with only a high school education received foot exams at 67.8%; this gap widens for adults that achieved less than a high school education with only 59.1% receiving foot exams (CDC, "By Education," 2012).
- The cost of diabetic foot ulcers is greater than that of the five most costly forms of cancer (Barshes et al., 2013).
- Diabetic foot ulcer patients are twice as costly to United States (U.S.) Medicare as those with diabetes alone (Rice et al., 2013).
- Inpatient care constitutes nearly two thirds of insurance costs for diabetic foot ulcers (Rice et al., 2013).
- The estimated annual U.S. burden of diabetic foot ulcers is at least $15 Billion (Rice et al., 2013).
- Sixty percent to 70% of those with diabetes will develop peripheral neuropathy, or lose sensation in their feet (Dyck et al., 1999)
- More than 90% of people with diabetic peripheral neuropathy are unaware they have it (Bongaerts et al., 2013).
- Up to 25% of those with diabetes will develop a foot ulcer (Singh, Armstrong, & Lipsky, 2005).
- The yearly incidence of diabetic foot ulcers ranges from 2% to 32%, depending on American Diabetes Association (ADA) risk classification (Boulton et al., 2008).
- More than half of all foot ulcers (wounds) will become infected, requiring hospitalization and 20% of infections result in amputation (Lavery et al., 2006).

- Diabetes contributes to approximately 80% of the 120,000 nontraumatic amputations performed yearly in the United States (Armstrong & Lavery, 1998).
- After a major amputation, 50% of people will have their other limb amputated within 2 years (Goldner, 1960).
- People with a history of a diabetic foot ulcer have a 40% greater 10-year mortality than people with diabetes alone (Iversen et al., 2009).
- Each $1 invested in care by a podiatrist for people with diabetes results in $27 to $51 of healthcare savings (Carls et al., 2011).
- Podiatry care not only reduces amputation risk, but also dramatically impacts rate of hospitalization and reulceration (Gibson et al., 2014).
- Podiatric medical care in people with history of diabetic foot ulcer can reduce high-level amputation from between 65% and 80% (Gibson et al., 2014).
- Instituting a structured diabetic foot program can yield a 75% reduction in amputation rates and a near four-fold reduction in inpatient mortality (Weck et al., 2013).

Evidence for Additional Information Supporting Need for the Measure

American Podiatric Medical Association (APMA). Diabetic foot & ankle care, peripheral neuropathy â€“ neurological evaluation. Washington (DC): National Quality Forum (NQF); 2014 Jul 25. 16 p.

Armstrong DG, Lavery LA. Diabetic foot ulcers: prevention, diagnosis and classification. American Academy of Family Physicians. Am Fam Physician. 1998 Mar 15;57(6):1325-32, 1337-8. [34 references] PubMed

Barshes NR, Sigireddi M, Wrobel JS, Mahankali A, Robbins JM, Kougias P, Armstrong DG. The system of care for the diabetic foot: objectives, outcomes, and opportunities. Diabet Foot Ankle. 2013;4. PubMed

Bongaerts BW, Rathmann W, Heier M, Kowall B, Herder C, StÃ¶ckl D, Meisinger C, Ziegler D. Older subjects with diabetes and prediabetes are frequently unaware of having distal sensorimotor polyneuropathy: the KORA F4 study. Diabetes Care. 2013 May;36(5):1141-6. PubMed

Boulton AJ, Armstrong DG, Albert SF, Frykberg RG, Hellman R, Kirkman MS, Lavery LA, Lemaster JW, Mills JL, Mueller MJ, Sheehan P, Wukich DK, American Diabetes Association, American Association of Clinical Endocrinologists. Comprehensive foot examination and risk assessment: a report of the task force of the foot care interest group of the American Diabetes Association, with endorsement by the American Association of Clinical Endocrinologists. Diabetes Care. 2008 Aug;31(8):1679-85. PubMed

Carls GS, Gibson TB, Driver VR, Wrobel JS, Garoufalis MG, Defrancis RR, Wang S, Bagalman JE, Christina JR. The economic value of specialized lower-extremity medical care by podiatric physicians in the treatment of diabetic foot ulcers. J Am Podiatr Med Assoc. 2011 Mar-Apr;101(2):93-115. PubMed

Centers for Disease Control and Prevention (CDC). Diabetes Public Health Resource: percentage of adults aged 18 years or older with diagnosed diabetes receiving a foot exam in the last year, by age, United States, 1994â€“2010. [internet]. Atlanta (GA): Centers for Disease Control and Prevention (CDC); 2012.

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Prevention (CDC); 2012.

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Goldner MG. The fate of the second leg in the diabetic amputee. Diabetes. 1960 Mar-Apr;9:100-3. PubMed

Iversen MM, Tell GS, Riise T, Hanestad BR, Ã˜stbye T, Graue M, Midthjell K. History of foot ulcer increases mortality among individuals with diabetes: ten-year follow-up of the Nord-TrÃ¸ndelag Health Study, Norway. Diabetes Care. 2009 Dec;32(12):2193-9. PubMed

Lavery LA, Armstrong DG, Wunderlich RP, Mohler MJ, Wendel CS, Lipsky BA. Risk factors for foot infections in individuals with diabetes. Diabetes Care. 2006 Jun;29(6):1288-93. PubMed

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Singh N, Armstrong DG, Lipsky BA. Preventing foot ulcers in patients with diabetes. JAMA. 2005 Jan 12;293(2):217-28.

Weck M, Slesaczeck T, Paetzold H, Muench D, Nanning T, von Gagern G, Brechow A, Dietrich U, Holfert M, Bornstein S, Barthel A, Thomas A, Koehler C, Hanefeld M. Structured health care for subjects with diabetic foot ulcers results in a reduction of major amputation rates. Cardiovasc Diabetol. 2013;12:45. PubMed

Extent of Measure Testing

Measures Tested

Measures from the *Diabetes Mellitus: Foot and Ankle Care* measure set tested in the American Podiatric Medical Association (APMA) Testing project:

- Ulcer Prevention - Evaluation of Footwear
- Peripheral Neuropathy - Neurological Evaluation

Methods

Three physician office sites participated in this measure testing project. Originally, four sites were identified and selected by Dr. James R. Christina, Director of Scientific Affairs for the APMA. One site withdrew due to time constraints resulting from a change in practice ownership.

All three physician office sites participating in this measure testing project represented urban settings on the East Coast. The practices each had two or more physicians, with physicians actively involved with

APMA.

Two trained data abstractors performed on-site chart reviews the weeks of October 1 and November 5, 2012. Testing was performed on paper medical records at one physician office site and in the electronic health record (EHR) environment for two physician office sites. The case samples for chart reviews were randomly selected from eligible patients seen at two of the test sites between January 1 and December 31, 2011. Due to a change in the billing system, one test site requested a change in the chart sample timeframe to October 1, 2011 through May 1, 2012 to allow for accurate identification of eligible patients.

Testing Performed and Results

Feasibility: Test site personnel completed a data collection questionnaire to provide information about the presence and location of each data element comprising the two measures within the medical record to assess the feasibility of data capture, calculation and reporting of the performance measures in a timely manner and at reasonable cost.

Results: This test revealed that it was feasible to implement these performance measures at the test sites with some EHR modifications.

Validation Against the Gold Standard Reliability

Parallel-forms reliability testing was performed by comparing manual abstraction of the data elements necessary to construct the measure from the medical records with Physician Quality Reporting System (PQRS) claims submission. Agreement was calculated between the two methods at the level of the numerator, denominator and exception (if applicable).

To validate inclusion in the numerator, the practice sites provided various identification methods. Two practices provided a report of the sampled list of patients per encounter with the PQRS codes submitted. The third site provided instructions on viewing the billing codes per dates or invoice within each patient's medical record.

Agreement rates were calculated and reported with kappa statistics with 95% confidence intervals to recognize any agreement that could be attributable to chance alone.

Results: The measures were found to be highly reliable with agreement rates ranging from 93 to 100%.

Refer to the APMA *2012 Measure Testing Project: Diabetic Foot & Ankle Care* for additional testing details.

Evidence for Extent of Measure Testing

American Podiatric Medical Association (APMA). 2012 measure testing project: diabetic foot & ankle care. Des Moines (IA): Telligen; 2012. 36 p.

State of Use of the Measure

State of Use

Current routine use

Current Use

not defined yet

Application of the Measure in its Current Use

Measurement Setting

Ambulatory/Office-based Care

Professionals Involved in Delivery of Health Services

not defined yet

Least Aggregated Level of Services Delivery Addressed

Individual Clinicians or Public Health Professionals

Statement of Acceptable Minimum Sample Size

Unspecified

Target Population Age

Age greater than or equal to 18 years

Target Population Gender

Either male or female

National Strategy for Quality Improvement in Health Care

National Quality Strategy Aim

Better Care

National Quality Strategy Priority

Prevention and Treatment of Leading Causes of Mortality

Institute of Medicine (IOM) National Health Care Quality Report Categories

IOM Care Need

Living with Illness

IOM Domain

Effectiveness

Data Collection for the Measure

Case Finding Period

The reporting period

Denominator Sampling Frame

Patients associated with provider

Denominator (Index) Event or Characteristic

Clinical Condition

Encounter

Patient/Individual (Consumer) Characteristic

Denominator Time Window

not defined yet

Denominator Inclusions/Exclusions

Inclusions

All patients aged 18 years and older with a diagnosis of diabetes mellitus

Note: International Classification of Diseases, Ninth Revision (ICD-9) diagnosis codes, Current Procedural Terminology Evaluation and Management (CPT E/M) service codes, CPT procedure codes, and patient demographics (age, gender, etc.) are used to identify patients who are included in the measure's denominator. An ICD-9 diagnosis code to identify patients with a diagnosis of diabetes mellitus and a CPT E/M service code or a CPT procedure code are required for denominator inclusion. Refer to the original measure documentation for coding details.

Exclusions

Clinician documented that patient was not an eligible candidate for lower extremity neurological exam measure, for example patient bilateral amputee, patient has condition that would not allow them to accurately respond to a neurological exam (dementia, Alzheimer's, etc.), patient has previously documented diabetic peripheral neuropathy with loss of protective sensation.

Exclusions/Exceptions

not defined yet

Numerator Inclusions/Exclusions

Inclusions

Patients who had a lower extremity neurological exam performed at least once within 12 months

Note:

Lower Extremity Neurological Exam: Consists of a documented evaluation of motor and sensory abilities and should include: 10-g monofilament plus testing any one of the following: vibration using 128-Hz tuning fork, pinprick sensation, ankle reflexes, or vibration perception threshold; however, the clinician should perform all necessary tests to make the proper evaluation.
G-codes are used to report the numerator of the measure. Refer to the original measure documentation for coding details.

Exclusions
Unspecified

Numerator Search Strategy

Fixed time period or point in time

Data Source

Administrative clinical data

Electronic health/medical record

Paper medical record

Type of Health State

Does not apply to this measure

Instruments Used and/or Associated with the Measure

Unspecified

Computation of the Measure

Measure Specifies Disaggregation

Does not apply to this measure

Scoring

Rate/Proportion

Interpretation of Score

Desired value is a higher score

Allowance for Patient or Population Factors

not defined yet

Standard of Comparison

not defined yet

Identifying Information

Original Title

Measure #POD 1: diabetic foot & ankle care, peripheral neuropathy - neurological evaluation.

Measure Collection Name

Diabetic Foot and Ankle Care Physician Performance Measurement Set

Submitter

American Podiatric Medical Association - Medical Specialty Society

Developer

American Podiatric Medical Association - Medical Specialty Society

Funding Source(s)

American Podiatric Medical Association

Composition of the Group that Developed the Measure

Podiatry Work Group: Vickie R. Driver, DPM (*Co-chair*); Matthew G. Garoufalis, DPM (*Co-chair*); A. Anthony Haro, III, DPM; Jengyu Lai, DPM; Stephen M. Pribut, DPM; Victor J. Quijano, Jr., DPM; John Steven Steinberg, DPM; James S. Wrobel, DPM, MS; R. Daniel Davis, DPM; Craig Gastwirth, DPM; David G. Armstrong, DPM, PhD

American Podiatric Medical Association: James R. Christina, DPM

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American College of Foot and Ankle Orthopedics and Medicine: James Stavosky, DPM; Rodney Stuck, DPM

Centers for Medicare and Medicaid Services: Latousha D. Leslie, RN BSN, MS

Financial Disclosures/Other Potential Conflicts of Interest

There were no potential conflicts of interest to report in the development of these measures.

Endorser

National Quality Forum - None

NQF Number

not defined yet

Date of Endorsement

2014 Dec 30

Measure Initiative(s)

Physician Quality Reporting System

Adaptation

This measure was not adapted from another source.

Date of Most Current Version in NQMC

2014 Aug

Measure Maintenance

Unspecified

Date of Next Anticipated Revision

Unspecified

Measure Status

This is the current release of the measure.

This measure updates a previous version: American Podiatric Medical Association (APMA), American College of Foot and Ankle Surgeons, American College of Foot and Ankle Orthopedics and Medicine, Centers for Medicare and Medicaid Services. Diabetic foot and ankle care physician performance measurement set. Bethesda (MD): American Podiatric Medical Association, Inc.; 2007 Aug. 11 p.

The measure developer reaffirmed the currency of this measure in December 2015.

Measure Availability

Source not available electronically.

For more information, contact the American Podiatric Medical Association (APMA) at 9312 Old Georgetown Road, Bethesda, MD 20814-1621; Phone: 301-581-9200; Web site: www.apma.org .

NQMC Status

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The information was reaffirmed by the measure developer on December 17, 2015.

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Production

Source(s)

American Podiatric Medical Association (APMA). Diabetic foot and ankle care physician performance measurement set. Bethesda (MD): American Podiatric Medical Association; 2014 Aug. 13 p.

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